

REMARKS

The Office Action issued 19 September 2001 and the Advisory Action issued 7 January 2002 have been reviewed and the comments of the U.S. Patent and Trademark Office have been considered. Claim 7 has been amended, and claims 2-4 and 6-10 remain pending. Accordingly, Applicant requests reconsideration of these pending claims.

Claims 2, 6, and 7 stand rejected under 35 U.S.C. §102 as being anticipated by DE 2912814 to Grimm. Claims 3-4 and 8-10 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Grimm.

Insofar as the rejections are applicable to amended claim 7, Applicant respectfully traverses the rejections as Grimm fails to teach or suggest the claimed invention as a whole. In particular, independent claim 7 recites a combination of features that includes forming a sealing portion by:

[g]rinding with a tool that has a conical end with a vertex of the conical end disposed in the transition portion to provide a select finish on the sealing portion, the transition portion provides a volume receiving the vertex of the tool so that the vertex avoids contact with the sealing surface and with the transition portion, the vertex being contiguous to the axis.

Support for the amendment is provided in the originally filed specification at, for example, at page 9, lines 10-14, and at page 12, lines 6-13, and Figure 2. Specifically, with reference to Applicant's Figure 2, the transition portion 614 provides a volume that receives the tip, i.e., vertex, of the grinding tool forming the needle sealing portion 612 on the axis 18. The transition portion 614 provides a volume receiving the vertex of the grinding tool so that the vertex avoids contact with the sealing surface 612 and with the transition portion 614. Thus, Applicant's preferred embodiment solves the problem of achieving a sufficiently high rotational speed (and hence a high quality surface finish on a seat) with a conical tool, which, as stated in the specification at, for example, pages 1 and 2, is insufficient to provide a desired surface finish because the velocity of the conical tool decreases near the vertex of the tool.

In sharp contrast, Grimm shows, in Figs. 1 and 2, a conical grinding tool 6 with a truncated cone instead of an actual vertex of a conical end, as recited in claim 7. Moreover, even if the grinding tool 6 of Grimm could be provided with an actual vertex, the hypothetical vertex would be spaced from an axis of the workpiece 1 (i.e. a seat) instead of a vertex being contiguous to the axis, as recited in claim 7. Accordingly, claim 7 is allowable over Grimm for at least this reason.

Furthermore, Applicant respectfully asserts that any proposed modification of Grimm in an attempt to reach the claimed invention as a whole would change the principle operation of Grimm, and could render Grimm unsuitable for its intended purpose. Grimm relies on a generally cylindrical guide member 4 to guide the grinding tool 6 as the workpiece 1 rotates about the axis of the spindle 5 in an eccentric motion. The guide 4 of Grimm is needed in order to guide the spindle 5 so that the grinding surface of the grinding tool 6 can grind into the sealing surface 3 as the roller 8 rotates the workpiece 1 in an eccentric motion relative to spindle 5 with a pressing force in direction 9. Without the guide 4 to constraint spindle 5 in a fixed position relative to the workpiece 1 of Grimm, the grinding tool 6 would be moved away from contact with the sealing surface 3 due the eccentric orientation of the workpiece 1 and the pressing force along direction 9. Therefore, one of ordinary skill in the art would not modify the grinding tool 6 and spindle 5 so as to place the actual vertex of the grinding tool 6 on the longitudinal axis because such modification would change an eccentric grinding motion to a rotary telescopic grinding motion. Consequently, to grind away material on sealing surface 3, any modification to Grimm in an attempt to reach the claimed invention as a whole would require the modified tool to move in telescopic motion relative to the longitudinal axis instead of an eccentric motion. As can be seen, however, such modification of Grimm could change the principle operation of Grimm—from an eccentric grinding motion to a telescopic grinding motion—which could render Grimm unsatisfactory for its intended purpose. And as noted at MPEP §2143.01, “[i]f the proposed modification would render the prior art invention unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification.” Accordingly, claim 7

is allowable over Grimm because Grimm fails to teach or suggest the claimed invention as a whole, as recited in claim 7.

Notwithstanding the deficiencies in Grimm, the Office Action relies upon legal precedent (routine optimization and Official Notice of common knowledge) as supporting rationales to render obvious the method recited in claims 3-4 and 8-10. First, Applicant respectfully asserts that the included angles and ratio of areas are not a matter of routine optimization of Grimm because these features have been discovered by the Applicant to allow a tool to achieve a desired surface finish while preventing the tool from removing coated material in other areas of the seat, to reduce sac volume, and to improve flow stability, as discussed in the specification at, for example, page 9, lines 15-26, page 10, lines 1-3 and 18-29. The only motivation to modify Grimm in an attempt to reach the claimed invention as a whole is supplied by Applicant's own disclosure, which has been improperly relied upon. Second, Applicant respectfully traverses the Official Notice taken by the Office Action that a select finish of between approximately 0.5 and 0.2 micrometers is known in the art because the Office Action has not provided adequate evidentiary support of such Official Notice. Finally, none of the legal bases cure the deficiencies of Grimm discussed above. Accordingly, dependent claims 3-4 and 8-10 are also patentable over Grimm because Grimm fails to teach or suggest the claimed invention as a whole.

CONCLUSION

In view of the foregoing amendments and remarks, Applicant respectfully requests the reconsideration of this application and allowance of the pending claims 2-4 and 6-10. Applicant respectfully invites the Examiner to contact the undersigned at (202) 739-5203 if there are any outstanding issues that can be resolved via a telephone conference.

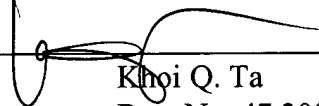
Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached pages are captioned "**VERSION WITH MARKINGS TO SHOW CHANGES MADE.**"

EXCEPT for issue fees payable under 37 C.F.R. §1.18, the Commissioner is hereby authorized by this paper to charge any additional fees during the entire pendency of this application including fees due under 37 C.F.R. §§1.16 and 1.17 which may be required, including any required extension of time fees, or credit any overpayment to Deposit Account No. 50-0310. This paragraph is intended to be a **CONSTRUCTIVE PETITION FOR EXTENSION OF TIME** in accordance with 37 C.F.R. §1.136(a)(3).

Respectfully submitted,
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Date: 03 September 2002

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VERSION SHOWING MARKED UP CHANGES

IN THE CLAIMS:

Claims 7 has been amended as follows:

7. (Thrice amended) A method of forming a fuel injector seat, the seat having an upstream face, a downstream face, and a passage extending along an axis between the upstream face and the downstream face, the method comprising:

forming within the passage an orifice portion proximate the downstream face and having a first transverse cross-sectional area relative to the axis;

forming within the passage a sealing portion proximate the upstream face and having a second transverse cross-sectional area relative to the axis that decreases at a first rate in a downstream direction from a first area to a second area;

determining a ratio of the first transverse cross-sectional area over the first area; and

forming within the passage a transition portion when the ratio of the first transverse cross-sectional area over the first area exceeds a predetermined value, the transition portion being interposed between the orifice portion and the sealing portion and having a third transverse cross-sectional area relative to the axis that decreases at a second rate in the downstream direction from the second area to the first transverse cross-sectional area, wherein the forming of the sealing portion includes grinding with a tool that has a conical end with a vertex of the conical end disposed in the transition portion to provide a select finish on the sealing portion, the transition portion provides a volume receiving the vertex of the tool so that the vertex avoids contact with the sealing surface and with the transition portion, the vertex being proximate to the axis of rotation contiguous to the axis.

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